

## **What is claimed is:**

**[Claim 1]** 1. An echo cancellation device in a full duplex communication system, the full duplex communication system comprising a transmitter section for transmitting a transmit signal and a receiver section for receiving a receive signal, the echo cancellation device comprising:

a filter for generating a filtering signal according to the transmit signal;

an echo canceller coupled to the filter for generating an echo cancellation signal according to the filtering signal; and

at least one resistor coupled to the transmitter section, the receiver section, and the echo canceller;

wherein the echo canceller further comprises a pull-up current source for increasing a DC level of the echo canceller.

**[Claim 2]** 2. The echo cancellation device of claim 1, wherein the echo cancellation signal corresponds to the transmit signal.

**[Claim 3]** 3. The echo cancellation device of claim 1, wherein the echo canceller is a digital-to-analog converter (DAC).

**[Claim 4]** 4. The echo cancellation device of claim 1, wherein the filter is a digital filter.

**[Claim 5]** 5. The echo cancellation device of claim 1, wherein the filter is a low pass filter.

**[Claim 6]** 6. The echo cancellation device of claim 1, wherein the filter is an RC network filter.

**[Claim 7]** 7. The echo cancellation device of claim 6, wherein the RC network filter comprises a resistor.

**[Claim 8]** 8. The echo cancellation device of claim 7, wherein the RC network filter further includes a MOS transistor to be electrically equivalent to the resistor, wherein the control signal is employed to control the equivalent resistance of the MOS transistor through controlling the gate voltage of the MOS transistor.

**[Claim 9]** 9. The echo cancellation device of claim 6, wherein the RC network filter comprises a capacitor and the equivalent capacitance of the capacitor is controlled by the control signal.

**[Claim 10]** 10. The echo cancellation device of claim 9, wherein the capacitor is a parasitic capacitor.

**[Claim 11]** 11. The echo cancellation device of claim 9, wherein the RC network filter further includes a MOS transistor to be electrically equivalent to the capacitor of the RC network filter.

**[Claim 12]** 12. The echo cancellation device of claim 9, wherein the capacitor is a metal stacked-layer capacitor.

**[Claim 13]** 13. The echo cancellation device of claim 1, wherein the echo cancellation device further comprises an echo residue detector for outputting a control signal to control the filter according to the echo residue at the receiver section.

**[Claim 14]** 14. An echo cancellation device in a full duplex communication system, the full duplex communication system comprising a transmitter section for transmitting a transmit signal and a receiver section for receiving a receive signal, the echo cancellation device comprising:  
a filter for generating a filtering signal according to the transmit signal;  
an echo canceller coupled to the filter for generating an echo cancellation signal according to the filtering signal;  
at least one resistor coupled to the transmitter section, the receiver section, and the echo canceller; and  
an echo residue detector for outputting a control signal to control the filter according to the echo residue at the receiver section;  
wherein the echo canceller further comprises a pull-up current source for increasing a DC level of the echo canceller.

**[Claim 15]** 15. The echo cancellation device of claim 14, wherein the echo cancellation signal corresponds to the transmit signal.

**[Claim 16]** 16. The echo cancellation device of claim 14, wherein the echo canceller is a digital-to-analog converter (DAC).

**[Claim 17]** 17. The echo cancellation device of claim 14, wherein the filter is a digital filter.

**[Claim 18]** 18. The echo cancellation device of claim 17, wherein the digital low pass filter is a finite impulse response (FIR) filter and the FIR filter is adjusted through adjusting at least a coefficient of the FIR filter.

**[Claim 19]** 19. The echo cancellation device of claim 17, wherein the digital low pass filter is an infinite impulse response (IIR) filter and the IIR filter is adjusted through adjusting at least a coefficient of the IIR filter.

**[Claim 20] 20.** An transceiver in a full duplex communication system, the transceiver comprising:

a receiver section for receiving a receive signal; and

a transmitter section coupled to the receiver section for transmitting a transmit signal, the transmitter section comprising:

a filter for generating a filtering signal according to the transmit signal;

an echo canceller coupled to the filter for generating an echo cancellation signal according to the filtering signal; and

at least one resistor coupled to the transmitter section, the receiver section, and the echo canceller;

wherein the echo canceller further comprises a pull-up current source for increasing a DC level of the echo canceller.